

ANNUAL REPORTS
FOR
YELLOWSTONE NATIONAL PARK

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FOR
YELLOWSTONE NATIONAL PARK
1929



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YELLOWSTONE NATIONAL PARK

Roger W. Toll, Superintendent

Yellowstone National Park, Wyoming

This year in Yellowstone National Park was characterized by numerous changes in the personnel. Horace M. Albright, who served as Superintendent beginning June 28, 1919, was promoted to the Directorship of the National Park Service, effective February 1, 1929, relieving Hon. Stephen T. Mather, who was forced to resign, due to illness. Mr. Albright served in the capacity of Superintendent of the Yellowstone longer than any former occupant of the position.

Roger W. Toll, Superintendent of Rocky Mountain National Park, became Superintendent of the Yellowstone, effective April 1, 1929. During the winter months, Assistant Superintendent M. F. Daum was Acting Superintendent and for the period from January 12, 1929 to March 19, 1929, when Mr. Daum was assigned to special accounting work in Washington, D. C., Assistant to the Superintendent Joseph Joffe was acting.

Sam T. Woodring, who served as Chief Ranger of the Yellowstone organization since 1922, was promoted to the superintendency of the new Grand Teton National Park, effective May 15, and George F. Bagley became Chief Ranger of the Yellowstone, effective June 22.

The fall season was very mild and it was possible to get to the Upper Geyser Basin by car until about the middle of

December. However, after the real winter weather set in, it was very severe and there was very little warm weather during the spring. Most of the roads were rather slow to open. The north and west gates were open to travel on June 1 and from the start there was a continued increase in travel over previous years. When the travel season closed, our records indicated an increase of 29713 visitors over last year, or 11 per cent.

The formal opening of the park took place at Gallatin Gateway, Montana, the Chicago, Milwaukee, St. Paul and Pacific Railroad's entrance to the Yellowstone. The address of welcome was made by the Superintendent of the Yellowstone and Hon. Horace M. Albright, Director of the National Park Service, H. A. Scandritt, President of the Milwaukee Railroad, and Major Evan Kelly, District Forester, gave short talks. Movie men representing Pathe Metro-Goldwyn, Paramount, International and the Fox Movietone were in attendance. About 50 Indians from the Flathead Reservation in Montana, as well as the Terry Montana Cowboy Band participated.

Road conditions in the park were very good during the summer and the newly oiled stretches held up particularly well under the extremely heavy traffic. With the large amount of rainy and cool weather early in the season, the park was particularly beautiful but after about the middle of July the continued warm weather dried up the country and presented an entirely

different appearance. The flowers were particularly beautiful during the early part of the season. The fire hazard was very serious late in the season, due to the continued warm weather and little rainfall.

The wild animals of the park were seen at numerous places during the entire park season and the bears were more in evidence than in any previous years. Fishing was excellent and afforded a great deal of amusement to the thousands of park visitors.

The continued extension of the educational work met with favor on every hand and park visitors received a great deal of benefit from the facilities available and the service extended. The new museum at Old Faithful was opened when the first park visitors arrived and proved to be one of the main points of interest in the park. A new trailside museum and ranger station was constructed at Madison Junction during the summer and will be available for park visitors next year, as will also a trailside museum near the Norris Geyser Basin. Several members of the President's Commission on the Educational Work in the National Parks visited the Yellowstone during the summer, including Dr. H. C. Bumpus, Dr. Frank R. Castler, Mr. William John Cooper and Dr. W. W. Atwood.

The new geyser which broke out in the Lower Geyser Basin last year continued to play during the summer and was one of the

main features of the park. This geyser was named by members of the National Editorial Association party while at Old Faithful on July 31. The name "Imperial" was selected for the geyser.

The new Director of the National Park Service spent a great deal of the summer in the park, familiarizing the new superintendent with his duties and aiding in the carrying on the work here.

The park this summer has been visited by a large number of prominent persons. Three United States Senators. Hon. Francis M. Warren of Wyoming, L. C. Phipps of Colorado, and Morris Sheppard of Texas; eight United States Congressmen, Hon. James P. Buchanan of Texas, Albert E. Carter of California, Vincent Carter of Wyoming, L. J. Dickinson of Iowa, David H. Vinchelee of Kentucky, John Sandlin of Louisiana, Addison T. Smith of Idaho and John W. Summers of Washington; three governors, Hon. H. C. Baldrige of Idaho, Frank C. Emerson of Wyoming and M. J. Halloway of Oklahoma; and two railroad presidents, Charles Donnelly of the Northern Pacific and F. E. Williamson of the C. B. & Q. Railroad viewed the park wonders. Even before the park was thrown open to the traveling public Major General John L. Hines, Commander of the Ninth Corps Area came in and covered all of the roads which were free of snow.

Other prominent visitors included Hon. Horace M. Albright, Director of the National Park Service; Lieut. General Robert Lee Bullard of the U. S. Army; Lady Holland of Longon; Carl Laemmle, President of Universal Pictures, Inc.; J. G. Woodworth, Vice President of the Northern Pacific; Rear Admiral Albert M. McCormick of the U. S. Army; President W. W. Campbell of the University of California; Dr. Merritte Weber Ireland, Surgeon General of the U. S. Army; Dr. Arthur S. Coggeshall, Director of Education, Carnegie Institution at St. Paul; Mr. Edmond J. Seymour, President of the American Bison Society; Mr. Archibald Douglas, Director of the Bank of America and Attorney for the Woolworth Estate; W. M. Jeffers, Vice President of the Union Pacific System; Col. W. C. Spruance, Vice President of the E. I. duPont de Nemours & Co.; U. S. Grant, Jr., son of former President U. S. Grant; Mrs. George Akerson, wife of the Secretary to the President; Grosvenor Atterbury, prominent architect of New York City; W. W. Bride, Corporation Counsel for the District of Columbia; Thomas Cochran, New York Financier; J. Oberhard Faber, noted pencil manufacturer; Seth H. Cordon, Conservation Director for the Izak Walton League of America; Horace McDavid, President Kiwanis International; George Washington Cobs Cakes, publisher and owner of the New York Times; Frank Robinson, Vice President of the Union Pacific System and many prominent business, professional and scientific men and women.

The two outstanding groups which visited the park were the National Editorial Association party and the Yellowstone Park Boundary Commission. The National Editorial Association party included newspaper men from all parts of the country. Prior to their entry into the Yellowstone they aided in the dedication of the new Grand Teton National Park, which was created on February 26, 1929 when President Coolidge signed the bill.

While in the Yellowstone this party selected the name for the new geyser which broke out during the summer of 1926. The name "Imperial" was selected. The Boundary Commission held hearings at Cody, Wyoming and Ashton, Idaho and covered the southeast corner, the southwest corner and the country southeast of the park on horseback. This Commission was made up of Dr.

E. E. Brownell of San Francisco; Dr. T. Gilbert Pearson of New York City; Dr. Arthur S. Morgan of Antioch College, Ohio; Mr. C. H. Ramsdell of Minneapolis and Mr. Arthur Singland of Washington, D. C. Director Albright, Superintendent Toll, Assistant Forester, L. E. Kneipp and Mr. R. H. Nutledge, the latter two of the U. S. Forest Service, accompanied the party on the pack trip through the southeast section.

The park was also visited by a party of European journalists representing leading newspapers from the old country. While this party was in the park one of its members, Mr. Georges Landoy

of Antwerp, Belgium fell into a hot pool in the Upper Geyser Basin receiving serious burns which later resulted in his death.

Members of the Wyoming Game and Fish Commission and members of the Commissions from Idaho and Montana held meetings in the park, as did also the Wyoming Peace Officers and Colorado Sheriffs and Peace Officers Association and the State Boards of Engineering Examiners.

WEATHER

Temperatures were near normal for the last four months of the year 1928. January, February and May of 1929 were below normal, and a slight negative departure occurred for June. Temperatures were practically normal during March, April, July and August. The lowest readings of the winter occurred on February 7, when the minima ranged from -27° at Mammoth to -50° at Riverside. The maxima so far this summer were 39° at Mammoth on July 25, and 94° at Riverside on July 31.

Precipitation was deficient in all months except October and July, with decided negative departures during December and May, although the latter month had twice the average amount of snow. Snow depths were somewhat below normal throughout the park until late in the winter, although some heavy falls occurred. Mammoth was short of the normal snowfall for the season by some

15 inches. Depths at the end of March were about 70 per cent of the normal in the park, but by the close of April were about average. Snow disappeared from the level at Mammoth the last of March, at the Buffalo Ranch the last of April, and during May at Gallatin, Riverside, and Snake River stations.

TRAVEL IN 1929

Park visitors this year totaled 260,697 as compared with 230,994 last year, an increase of 29,713. The rail travel figures were 38,979 as compared with 41,697 last year, a decrease of 2,718. A comparison of rail figures of this season and last year are as follows:

Gateway	1928	1929	Gain	Loss
North	13,021	12,243		778
West	21,001	19,213		1,788
East	7,567	7,233		334
South	108	290	182	
Total.....	41,697	38,979	182	2,900

Rail travel accredited to the West Entrance during the tourist season of 1929 consisted of 14,520 persons via the Oregon Short Line Railway (Union Pacific System), 3,128 via the C.M.St.P & P. (Gallatin Gateway terminal of the Milwaukee), and 401 persons from the Bozeman terminal of the Northern Pacific,

plus 1,164 temporary employees of the Government and Park operators.

Automobile visitors by entrance gateways, as compared with last year are as follows: (This travel is exclusive of motorcycle and preseason auto visitors.)

Gateway	1928	1929	Gain	Loss
North	39,887	39,198		689
West	67,495	76,897	9,402	
East	58,128	73,732	15,604	
South	18,055	24,758	6,703	
Total.....	133,565	214,585	31,709	689

The number of cars and visitors reported at developed public camp grounds during the season of 1929 are as follows:

Designated Developed Camp Grounds	Cars	Campers
Old Faithful 1	22,763	71,931
Canyon	13,771	43,516
Mammoth	13,998	44,233
West Thumb	3,520	11,123
Lake	17,780	56,104
Norris Junction	974	3,077
Madison Junction	1,664	5,258
Tower Falls	2,287	7,226
Total.....		

Approximate number of cars and campers using undeveloped campsites : 3,698 : 11,685

Total Season Travel by Entrance Gateways

1929 and 1928

	:	:	:	:	:	:	:	:	:
	:	By Automobile	:	By Motorcycle	:	Misc. (walk-	:	Pre-	:
	:	Rail :	:	:	:	ing.	:	season :	:
	:	Visi-:	:	Visi- :	:	horse-	:	visi-	:
Gateway	:	tors :	Cars :	tors :	Cars :	tors :	back etc:	tors :	tors :
<hr/>									
1929									
North	.....	12,243	13,801	39,198	:	40	:	50	:
						424	:	3726	:
									55,701
West	.....	19,213	23,696	76,897	:	40	:	14	:
						271	:	603	:
									97,028
East	.....	7,233	23,061	73,732	:	78	:	96	:
						244	:		:
									81,305
South	.....	290	7,777	24,758	:	23	:	28	:
						1473	:	108	:
									26,663
Total		38,979	68,415	214,585	:	181	:	218	:
						2478	:	1437	:
									260,697
<hr/>									
1928									
North	.....	13,021	13,581	39,887	:	43	:	48	:
						277	:	2,508	:
									55,741
West	.....	21,001	20,536	67,495	:	51	:	68	:
						284	:	556	:
									93,404
East	.....	7,567	18,258	58,128	:	54	:	66	:
						274	:		:
									66,035
South	.....	108	5,653	18,055	:	10	:	14	:
						1,591	:	36	:
									19,804
Total		41,697	58,028	183,565	:	158	:	196	:
						2,426	:	3,100	:
									230,984

Many new travel records were established this season. The opening of the Grand Teton National Park has encouraged more traffic by way of the South Entrance. More cars had checked in at the South Entrance by August 16, this season, than were recorded at that gate for the entire season of last year.

ADMINISTRATION

Headquarters Office: On January 12, 1929 Superintendent Herace M. Albright was promoted to the position of Director of the National Park Service and on April 1, 1929 Roger W. Toll, Superintendent of Rocky Mountain National Park, was promoted to the position of Superintendent of Yellowstone National Park.

The regular personnel consists of Roger W. Toll, Superintendent; Merrill F. Daum, Assistant Superintendent; Joseph Joffe, Assistant to the Superintendent; Leroy Hill, Disbursing Clerk; Andrew R. Edwin, Senior Clerk and Bookkeeper; Margaret M. Jamieson, Files and Personnel Clerk; Mary Faring, Clerk-stenographer; and Esther Martin, Timekeeper. This force is augmented during the summer season with two clerk-stenographers and one assistant cost clerk. The maximum number of employees upon the payroll at one time was approximately five hundred. Our labor turn over amounted to less than 20 per cent.

Appropriations: Appropriations made available since the date of the last report are as follows:

Roads and Trails, National Parks	\$343,789.08
Donations, National Park Service	20,907.51
*National Park Service, 1929-30	153,000.00

* \$3000 reserved for Washington office expenditures and \$1,530 as an unallotted reserve. \$970 also transferred to Field Headquarters.

Revenues for 1929: Funds collected during the fiscal year 1929 and deposited to the credit of Miscellaneous Receipts in the United States Treasury were as follows:

Franchise and permit fees	112,223.25
Automobile and motorcycle permit fees	172,523.00
Electric current	5,775.93
Water rent	662.48
Miscellaneous	<u>13,920.11</u>
Total	304,945.17

ENGINEERING DEPARTMENT

This department is in charge of Resident Engineer Cecil A. Lord and Assistant Resident Engineer Lloyd C. Regnell. The duties consist of road maintenance, including dust prevention and snow removal, road reconstruction and improvement and surfacing.

Road Maintenance: The park road system consists of 302 miles of road designated as follows: Grand Loop 142 miles, approach and connecting roads 77.6 miles, roads to points of interest 83.4 miles. In addition, the park force maintained 20 miles of the East Entrance Road in the Shoshone National Forest and 32 miles of the South Entrance Road in the Teton National Forest. Much new maintenance and equipment was placed in use this year and at the end of the season there were in service 2 heavy tractors, 1 light tractor, 10 motor patrol graders, 11 small dump trucks, 2 light trucks and 21 teams and wagons.

Dust Prevention: Light oiling for dust prevention was started June 7. Approximately 170 miles were oiled to varying widths with two to three applications of heavy "80-70 per cent" road oil at the rate of one-sixth gallon per square yard. The number of applications as well as the rate of application varied to some extent with the volume of traffic, the type of road surface and weather conditions.

A new type of road maintenance was found necessary over that used in the past. This consisted of lightly scarifying the oil mat and processing by blading it back and forth across the road to obtain a uniform mixture which was then spread out on the surface and compacted by traffic. The uniformity of the resulting surface is better able to withstand traffic than the mat formed after applying the oil.

The equipment used in performing this work consisted of one insulated pressure distributor tank of 1,000 gallon capacity mounted upon a White truck, 6 White and 3 Graham three-ton freight trucks mounting insulated tanks of 1,000 gallon capacity and one 30,000 gallon insulated storage tank with steam boiler alongside, for heating the oil, at the railroad at Gardiner, Montana. Approximately 500,000 gallons of oil were used this year in this work with an average haul of 45 miles to point of application. Increasing traffic made it necessary to make more applications upon the main highways than

last year, thereby decreasing the mileage of roads oiled. The oiled roads carried traffic up to 2,000 vehicles per day and such traffic made constant maintenance as described above necessary.

Snow Removal: Weather conditions were unfavorable for the normal melting of snow. The work of opening the roads was started April 22 with the blasting of snow in Golden Gate. The road along the west side of the park was opened to traffic May 17 and the road to the east side May 29. Other roads were opened to traffic as follows: Old Faithful to Thumb, June 6; South Entrance, to the East Entrance, and through Dunraven Pass, June 18; across Mt. Washburn, July 1. Unusually cold weather in May and June retarded this work considerably and also was the cause of much sub-grade difficulty between Lake and Canyon where the late melting snows kept the ground in a saturated condition until the latter part of July.

Roadside Cleanup: Prior to this year, 45 miles of roadside cleanup had been done with donated funds and 24 miles with our government construction funds. This year a system of maintaining this cleanup along with our regular road maintenance work was inaugurated. Accordingly 69 miles of roadside cleanup have been maintained.

Road Construction: Road construction and road reconstruction were carried on as outlined below:

Project 1-A Mammoth-Morris Junction: The reconstruction of the first three miles of this project north of Morris Junction was completed this spring and surfaced with 6 inches of obsidian sand. Unusual difficulties were encountered during this reconstruction in excavating through the "hot formation" where the material was too hot to blast or for continuous hand work. There will be no additional work upon this project this fall.

Project 1-B, Morris Junction - Madison Junction: The contract for the reconstruction of five miles of the Gibbon Canyon Road between Gibbon Meadows and the old Mesa Road junction was completed last fall at an approximate cost of \$107,712. This contract did not provide for the surfacing of the new road nor for the rebuilding of the two steel bridges that span the Gibbon River.

Project 5-B, East Entrance - Sylvan Pass: The four miles of road reconstruction under contract will be completed this fall. An additional contract for the remaining six miles between the East Entrance and Sylvan Lake was let this summer and is under construction at the present time. Due to the difficulties nature of the work and the topography of the country, it will be at least another year before this new section will be in use by traffic. This last contract provides for surfacing of the East Entrance Road from Lake Butte to the East Entrance, a distance of



of some miles which includes the project of the creek
section completed last fall.

Project 5-C, Oak Creek Section of East Gallatin Road:

This project was completed last December and has been in use all
season. The contract was let for the completion of this project
this year.

Project 6-A, West Gallatin Road: This project was completed
last fall.

Project 6-B, Graveling Creek Section of West Gallatin
Road: This work will consist of graveling 14 miles of the road
along the West Gallatin River through the northern portion of
the park. The work is being performed with graders and
with equipment consisting of about 100 tons of gravel, 3 or
more heavy dump trucks, 1 motor tractor, and other, and mis-
cellaneous grilling equipment. This work will be completed in
September and will cost approximately \$70,000. No work has
been done for grading.

Highway Road Graveling: Twelve miles of this work was
partially completed last year. One hundred and twenty tons of equip-
ment was used for the graveling work. The graveling of the miles
of the road was done with a motor tractor, 12,000 to 20,000
gallons of oil per mile. The graveling of the miles was ap-
proximately 24,000 gallons per mile. About 100 tons of gravel
was used this summer, 12 miles of road was graveled and con-
siderable regrading was necessary to get a smooth surface.

WILLIAM J. FROST

Maintenance: Considerable improvements have been made in

The main storehouse in the rearrangement of the stores, and the construction of additional bins. A cork concrete lined cold storage room was constructed and equipped with a one-half ton ammonia refrigeration plant. Separate receiving and shipping rooms were arranged. The storehouse office space was practically doubled. The old blacksmith shop was coiled and remodeled into an auto shop. This included the installation of necessary heating units. The blacksmith shop was removed to the space formerly occupied by the army horseshoer, which was remodeled to take care of this activity. The usual minor building maintenance was carried on throughout the park. The exterior of the storehouse was painted this season the usual stone gray color. An old storehouse building was remodeled into duplex apartments this year. This building was originally constructed in 1891 as a granary.

New Construction: One snowshoe cabin was constructed in conjunction with the new museum at Madison Junction. A bunkhouse and messhouse were completed at Morris Junction as were bunkhouses at Lewis River and at Madison Junction. These are the standard type ten-man buildings. A duplex one and a half story ranger station was completed this spring at the South Entrance. A three lane checking station was constructed at the East Entrance. A standard messhouse was constructed at Tower Junction. This fall we expect to construct another snowshoe cabin in conjunction with the museum to be built at Fountain Paint Pot. We are constructing an entire road camp unit, consisting of mess-house, twenty-man bunkhouse and three stall stable at Lake. We are constructing

a stable at Canyon and West Thumb for road crews at these points and a large bunkhouse at the Buffalo Ranch. The Museum at Old Faithful was completed this spring and opened to the public June 20.

LANDSCAPE ENGINEERING

The architectural, landscape, and planning problems of the park were handled by Prof. C. Vint, Chief Landscape Architect, and H. C. McCarter, Jr. Landscape Architect who was in residence in Yellowstone Park during the building and construction periods. Mr. Vint made four visits to the park during the year on general inspection trips. Considerable work was done on the Mammoth Hot Springs area general plan. Plans were drawn in the Headquarters office for the Park Service buildings listed elsewhere in this report and all concessionaire buildings constructed were approved, located and supervised by the Landscape Division.

Very little planting of shrubs or trees was done this year due to the rapid extension and general alterations of most of the concessionaire units which necessitated revised layout plans. The Landscape Division is preparing a schedule of data pertaining to the planting needs of both the Park Service and concessionaires whereby a definite planting project is hoped to be inaugurated.

Roadside Cleanup: Roadside cleanup was carried on this year both with donation and government funds. The roadside

cleanup between Canyon and West Thumb was completed last fall and work was started on a new project between West Yellowstone and Old Faithful of which seven miles have been completed and approximately seven more miles are now under way. Roadside Cleanup has been started upon the Norris - Madison Junction road reconstruction contract work, and the Cub Creek road reconstruction contract and is being carried on as part of our regular reconstruction work on the West Gallatin project.

Approximately 63 miles of roadside have been cleaned up to date, 43 miles of which has been done with donation funds. This work has included not only the removal of the logs and debris of that nature along the road, but also of obsolete structures such as sprinkling tanks, pipe lines, etc. All but 50 of the 350 sprinkling tanks have been removed during the past three years.

WATER SUPPLY DEPARTMENT

This work is carried on under the supervision of Mr. H. B. Hanson of the U. S. Public Health Service and under the direct charge of Mr. William V. Higgins. Mr. Hanson made a thorough inspection of our entire operations in July and outlined necessary corrective measures. He also worked up a definite program for our water and sewer system and sewage disposal construction work. Mr. Higgins makes weekly sanitary inspections as outlined by Mr. Hanson.

The sanitation work consists of garbage collection and disposal, auto camp maintenance and policing and is carried on with

a fleet of six one ton trucks and five teams and wagons. With this equipment each main auto camp is thoroughly policed and all comfort stations are cleaned out each day and each small or outlying auto camp is policed and cleaned up every other day. At Old Faithful and Lake four ton garbage incinerators are operated for the disposal of all garbage originating in these areas. The Lake area includes the Fishing Bridge Auto Camp. During the peak of the season these incinerators are run to full capacity for eight hours.

With the granting of a concession for the selling of wood for fuel in practically all the auto camps, this phase of our auto camp activity has become a negligible item as wood is furnished now in only the outlying camps.

Auto Camp Extension and Improvement: We have concentrated this year in the extension of the Fishing Bridge, Thumb and Old Faithful auto camps. The work consisted of building fire places, tables and bear proof garbage stands.. No great increase in area was made to any auto camp, but additional camp sites were provided in the present area and wider roads were necessary to care for the increased travel. This is particularly true of the Thumb Auto Camp where a new entrance has been constructed and of the Old Faithful Auto Camp, where the main roads have been widened from twenty to forty feet in order to accommodate the traffic that

is attracted to the bear feeding grounds. No comfort stations were constructed this year.

Extension of the Water System: This work this year consisted in extensions in the Old Faithful-Tumb Auto Camp to provide new camp sites and the construction of small systems for the Cooke City Ranger Station, the Lewis River Road Camp, the Norris museum and the Canyon Incinerator.

Sewer Extension and Improvement: Except for minor extensions, all the work was concentrated upon the construction of a new concrete sedimentation tank and concrete covered filtration tank which is to provide for the Fishing Bridge Auto Camp. Additional facilities were provided at Tumb Auto Camp which has outgrown the system constructed in 1933. All auto camps with the growth of the housekeeping units have over-taxed the existing facilities to a great extent during the past season. Our sewage disposal system consists of the operation of six septic tanks with chlorine sterilization apparatus and four sedimentation tanks.

Garbage Incinerator at Canyon: A new four ten incinerator similar to that constructed at the Lake is being built at Canyon this year to care for all the garbage from the Canyon area. This structure is being located half a mile west of the Chittenden Bridge.

Sanitary Control: This year sanitary control consisted of

The spraying of seven hundred gallons of oil upon dams and pools adjacent to our various auto camps and extensive ditching.

ELECTRIC DEPARTMENT

This Department is in charge of Chief Electrician, Charles J. Dale, who has three permanent power plant operators and one permanent telephone operator.

During the past winter, two turbines from the hydroelectric plant at Mammoth have been reconditioned, causing an increased plant efficiency and using 25 per cent less water this year than last year, with the result that our water supply lines have not been overloaded and have been able to carry the load all season without interruption. Our peak load this year has increased considerably from last year on account of the installation by the Yellowstone Park Hotel Company of a 25 H. P. steam generator.

	1917-18	1918-19
Total production in K.W. hours..	736,150.0	706,630
Sold to park operators.....	21,319.3	20,521
Line loss and used by the Govt.		
in residences, of for power		
and street lighting.....	633,030.5	682,370

We operate no other electric systems in the park except a distribution system in the Old Faithful and Lake Auto Camps. These have not been enlarged this year.

Telephone System: This year's heavy telephone maintenance consisted of the reconstruction of 15 miles of line in Slough

Spook, using native poles and metallic circuit; the addition of metallic circuit between Mammoth and Merula, a distance of 20 miles; the replacement with cedar poles and metallic circuit of eight miles of the line between Lake and Thumb; and the repoling of the 32 miles of line between Mammoth and West Gallatin Ranger Station. To maintain 528 miles of circuit and a total of 158 telephones. The switchboard now located in the ranger station at Lake will be moved to new quarters in the mess-house being constructed this fall, where rooms have been provided for the telephone office and quarters for the operators.

PROPERTY

On June 20, Purchasing Clerk Russell Sprinkel was transferred to Yosemite National Park as Chief Clerk and the storehouse was reorganized with Oscar B. Mason as storekeeper placed in charge of all operations, the position of Record Clerk being made a six month's temporary position. Thomas McLean, Record Clerk, on August 22 was promoted to the position of Purchasing Clerk. One temporary clerk-stenographer and two permanent laborers assist in the operation of this department.

During the past year approximately \$175,000 of materials and supplies have been issued to various departments of this organization and cooperative bureaus, and approximately \$66,000 worth of equipment, as compared with \$40,000 last year, has been purchased for the use of the various departments.

During the summer season four additional laborers are necessary to carry on this volume of work and in addition it requires the time of one five ton truck and driver to transport freight between the railroad and the storehouse.

From this storehouse was operated a government mess for the feeding of our employees throughout the year. Some 26 messes were operated for this purpose and approximately \$80,000 was spent upon this operation, which is in the direct charge of Foreman Deane T. White. A mess is operated at headquarters all the year round due to our inability to secure a suitable contractor. The maximum number of meals per day was during last July when we fed 35,708 meals.

MECHANICAL DEPARTMENT

This department is in charge of Master Mechanic Robert R. Robinson who has six permanent mechanics, one permanent blacksmith, two temporary mechanics and two temporary blacksmiths under him. Our equipment list consists of two five passenger sedans, one seven passenger touring car, one coupe, six motorcycles, eleven tractor units, two power shovels, one compressor, miscellaneous small tools and camping equipment for three hundred men. This equipment is overhauled each year and placed in condition for efficient operation the coming season. Although the operating season is short, yet in order to guarantee continuous operation the overhauling work has to be more intensive

in order to detect the partially worn out units that would not last a full season.

This department operates a fleet of 18 freight trucks and ten oil trucks. This operation consists of loading freight, distributing crews and the follow up necessary to carry freight to all parts of the park and the securing of return loads. In addition to the materials and supplies carried by these trucks, all camp equipment and all crews are carried from headquarters to the various locations and then returned in the fall. Approximately 5,600 tons of materials and supplies were carried in the past last season. No estimate can be made of the amount of equipment transported.

PROTECTION DEPARTMENT

Personnel consists of one chief ranger, four assistant chief rangers, 26 permanent park rangers, and 43 temporary park rangers (employed for the tourist season - period of service approximately 30 days).

Winter Activities. The fall, winter and spring season activities were mainly regular and special patrols for the observation and protection of wild animal life, the observation of weather conditions, reading and recording water gauge heights, snow depths, etc., hunting predatory animals, repair and maintenance of telephone lines, buildings and other equipment, wild animal feeding at the lay ranches, the care and feeding of the park service horse herd at their winter feed grounds.

Summer Season Activities: The ranger organization has been kept busy during the tourist season checking entrance and exit travel; regulating traffic; dispensing information; conducting parties; delivering lectures; compiling reports; maintaining and repairing trails, snowshoe cabins, ranger stations, and other improvements; making patrols for control of forest fires and other regular and special patrols for the protection of the natural features of the park.

Forest Fires: Precipitation for June and July was slightly below normal. The season for fire hazards began slightly earlier than last year. Precipitation during August was very light. Temperatures were a little above normal. Numerous roadside fires have been reported, and extinguished. A few small fires in the interior of the park have been suppressed before they gained headway. The total number of fires to date is 13; the total expense for the year is \$336.64. Prompt action in all cases has reduced the loss from fire to a minimum.

Trail Construction, Maintenance and Improvements: New trail construction consisted of one-half mile at the Imperial Geyser, one-fourth mile near Osprey Falls, 1 1/2 miles between Snake River ranger station and West Thumb ranger station. A new guard rail was constructed at West Thumb around the paint pots, new platforms and steps near Tower Falls, new guard rails around the Mud Volcano, 200 feet of guard rail near the Imperial Geyser and 100 feet of

guard rail in Black Sand Basin. Trail maintenance work has been carried on extensively at Mammoth, Canyon, Lake, and Old Faithful. All patrol trails and main pack trails have been cleaned and repaired. The total trail mileage within the park is approximately 902 miles, including trails of all classes. Total money spent on trail work for the year was \$2,639.

Fish Planting: Fish planting has been carried on under the supervision of the Bureau of Fisheries. The work is tabulated in the comparative table given below.

	1927	1928	1929
Total collection of black spotted trout eggs from park waters....	13,313,000	23,684,000	14,655,000
Number of eggs collected in park, hatched and returned to park waters or planted as eyed eggs..	5,113,000	8,347,000	7,152,000
Total fish shipped to outside points.....			27,000
Total eggs shipped to outside points.....	5,523,000	10,414,000	6,852,200
Total.....	11,093,000	13,961,000	14,031,200
Total number of fish planted in park waters:			
Black spotted trout collected in park.....	5,113,000	8,347,000	7,152,000
Brook trout received from Boreman; Montana hatchery.....	37,750	13,000	31,600

Loch Leven trout received from :	:	:	:
Bozeman, Montana hatchery.....:	:	71,500 :	84,000
Rainbow trout received from :	:	:	:
Bozeman, Montana hatchery.....:	52,500 :	98,000 :	37,500
Rainbow trout received from :	:	:	:
Saratoga, Wyo., Hatchery.....:	16,000 :	:	-----
<hr/>			
Total fish plants for year..	5,219,000 :	8,530,300 :	7,304,900
<hr/>			

Loss on eggs and fry this season 643,800.

BUFFALO RANCH ACTIVITIES

The work at the Buffalo Ranch during the year has consisted mainly of care and keep of the herd, harvesting of 500 tons of hay, as compared with 945 tons last year. There is a total of 1100 tons of hay available for feeding during the coming winter. New construction is as follows: 1 new log bunk house, size 72 x 24, 95 per cent complete; 700 feet of pole fencing consisting of 50, 14-foot panels; new chutes and squeezes; and some new hay corral work. Other general ranch activities have been repaired and maintenance of equipment, irrigation and cultivation of fields, and other general ranch activities. No live buffalo were shipped during the past year. One hundred head of steers were slaughtered, during the month of December, and sold for market purposes. One outlaw bull was destroyed, two buffalo died from accidents, one winter killed, and two cripples were destroyed.

HAY RANCH OPERATIONS

Wild animal and horse feeding at the Slough Creek, Yancey, and Gardiner ranches accounted for 302 tons of hay. There is a

balance of 167 tons of hay now on hand. With the 1929 crop and the carry-over there is now on hand 1,212 tons of hay. Other ranch operations have been repair and maintenance of equipment and buildings. No construction has been carried on at any of the hay ranches.

PREBARY ANIMALS

Two hundred and eighty eight coyotes were killed during the past year, as compared with 284 a year ago, and 238 in 1927.

NATURAL FEATURES OF THE PARK

Forest and plant life, thermal activities and wild life conditions have been observed and reported by the park rangers throughout the year. A brief summary of their observations is given as follows: Generally, conditions have been somewhat better than the previous year.

Buffalo-Lamar River Herd: The herd total on May 31, exclusive of the 1929 calf crop was 947, divided as follows: 432 adult males, 378 females, 137 calves. The latest count of the 1929 calf crop taken on September 21st was 145.

Buffalo-Cold Creek, Pelican Creek Wild Herd: No special reports are available for this herd, although 17 head were reported on Cache Creek in March, and a number have wintered each year near Turbid Lake, and in Pelican Creek near the warm springs. The general condition of all wild animals observed was good. There seems to be a gradual intermingling of the wild and tame herd.

It has reached a point where it is difficult to distinguish the buffalo of the wild herd from those of the Lamar River herd.

Mountain Sheep: The largest count obtained during the year was 77 as compared with 170 last year. Winter kills and other losses accounted for seven. During the past winter the sheep did not bunch as much as they have in previous winters. Bands wintered on Mt. Everts, Junction Butte, and Mt. Morris. During the summer tourists have observed a band on Mt. Washburn, and a few have been reported near the Cooke City road, between Soda Butte and Cooke City. Although mountain sheep in the park are not quite as numerous as a year ago, those remaining seem to be in good condition.

Antelope: A count secured in March 1929 shows 510 animals, and winter losses of all kinds accounted for 24. The antelope were on their spring range April 12. They were observed near the Buffalo Ranch on April 26. The antelope are frequently reported on the Game Preservation Ranch, on the Gardiner Ranch, and are observed nearly every day in the Tower Falls district. The latest estimate secured on September 21st was 638. All animals observed during September were in excellent condition. A discussion took place during the Wyoming Game Commission meeting about antelope and reports state they are increasing.

Moose: Estimates secured during the winter of 1928 and 1929 give the number of moose in the park as 675. The largest

number observed was in the Upper Yellowstone district where 97 were counted on one patrol. No winter losses have been reported. The moose are very well distributed over the park. Spring and summer appearances have been reported from Slough Creek, Tower Falls, Soda Butte, Canyon, Upper Yellowstone, Cub Creek, Bechler River, and numerous other parts of the park. Comparative counts and estimates show the moose to be increasing, and all moose observed seem to be in good condition.

Deer: Counts during the winter of 1928 and 1929 show 530 mule deer. The largest band observed during the year was 221 head observed in early May on the Game Preservation Ranch. Report of winter losses, 33. A few were killed during the winter by hunters, but the figures are not available. Deer have been observed throughout the entire tourist season along the roadsides and at a great many places in the park. While the count of 530 was taken during the winter, it is estimated that there are a thousand or more deer in Yellowstone Park. Forage conditions for the deer during the summer have been excellent. No losses have been reported during the past summer.

Elk: The elk have been the subject of a great many discussions. Special elk investigations have been carried on within the park by Mr. W. H. Rush of the U. S. Forest Service, who has spent most of his time since February 15 on elk study. Dr. C. J. Merriam of the Bureau of Biological Survey has been conducting

extensive investigations in the Jackson Hole region. During the month of July, at a triangular game commission meeting held in Mammoth Hot Springs, Dr. Murie and Mr. Rush gave accounts of their investigations to the commissioners, and many good points relative to better management of the elk herds were brought out.

The annual elk count secured in Yellowstone National Park during April gives the total number in the park, including the Gallatin herd, as 13,309 as compared with 14,150 last year. The count was secured with the cooperation of the Forest Service and the game officials of Montana. At the time the count was taken the elk were still on their winter range in the Lamar River country, Blough Creek, Hellroaring, Blacktail and Gallatin districts. The loss during the year from disease and other causes was 48 animals. A total of 161 was reported killed by hunters during the 1928 hunting season. The elk did not migrate from the park on the north side, which accounts for the relatively small kill by hunters. Winter range conditions for the elk were very good, much better than the previous winter. The snow fall was somewhat lighter, and did not crust as heavy as usual. Consequently the elk were in far better condition when spring came than has been the case for a number of years. The summer forage conditions have been excellent. Elk started their migratory movement to summer range in early May, and they have been reported by rangers on patrol in all

the higher parts of the park. Tourists have been able to see elk along the roadside in Hayden Valley, Elk Park and Gibbon Meadows, and along the road from Mammoth to Mt. Washburn. Elk feeding was started at Slough Creek on January 12 at the Lower Ranch. One hundred and fifty to 400 animals were fed each day until March 18, when feeding was discontinued. One hundred and twenty tons of hay were fed. Approximately 100 tons of hay are still on hand at lower Slough Creek. Feeding was started at the Upper Slough Creek ranch on January 16 and discontinued on March 25. Ninety seven tons of hay were fed at the Upper Ranch. Approximately 167 tons of hay remain for use this coming winter. No authentic reports are available on the Jackson Hole herd. The annual carry-over of hay from all ranches, and the 1929 crop from the Slough Creek ranches insures an ample supply to take care of the elk for the coming winter, unless an unusual hard winter forces them to leave the park.

Bears, black and brown: The last available counts on black and brown bears give the number as 350. Later counts show a total of 440. Bears have been frequenting the camp grounds and bear feeding grounds at all points throughout the park. Large numbers are reported from Old Faithful, Canyon, Lake, Thumb, and Mammoth. The bear population of Yellowstone seems to have reached a point where they are somewhat of a nuisance.

Bears, Grizzly: The grizzly bears of Yellowstone have increased until the total counts and estimates show 130 to be in the park. Numerous grizzly mothers with three cubs have been observed. No doubt the excellent condition of the bears is accounted for by the abundant food supply in the way of garbage and scrape from public auto camps. During the past summer two major injuries are credited to the grizzly bear, one at Old Faithful and one at Canyon. Both injured parties recovered, however. It is proposed to ship a few live grizzlies to zoos or museums to reduce the number of grizzly bears to a point where they will not be a nuisance.

Beaver: Throughout the park beaver have entirely cleaned out a great many aspen groves and small willow parks. No doubt, beaver are increasing very rapidly. Tourists report seeing beaver at a great many points in the park. This little animal has furnished a lot of amusement for the tourists. Their food supply is running short at some points. However, as their food supply is exhausted at one point they will migrate to another place and start their construction work. The beaver dams are a very valuable aid to fish culture in the park, as their small dams provide natural rearing ponds for young fish.

Waterfowl: Ducks, geese, and other birds were observed in large numbers throughout the past summer and fall. The pelicans on Yellowstone Lake show an increase of about 50 birds. A count

taken during July shows 76 old birds, and nearly 100 young on Pelican Island in Yellowstone Lake. Swan have been observed on the Yellowstone River and other places. Various species of ducks have been seen on all waters of the park. The National Park Service is cooperating with the Bureau of Biological Survey in securing a monthly waterfowl census. This cooperating agreement began in July 1927. The results so far justify its continuation.

Trees and Insects: No serious outbreaks of forest insects have occurred during the past year. The usual amount of infestation of Oregon Engraver Beetle was present. The trees in several areas which were attacked were cut and burned. Of these areas Roaring Mountain was the largest. Other attacks occurred along the Norris Road, at West Thumb and Old Faithful Auto Camp. During July the Mammoth Auto Camp was sprayed twice for aphid and the trees are in much better condition at the present time. The Bechler River region is heavily infested with Spruce Budworm attacking Lodgepole Pine. The Bureau of Entomology has conducted test dusting and spraying in that area and it is hoped that they will perfect some method of control at this point. The sawfly and needletyer have almost ceased activity in the vicinity of West Yellowstone and the attack will probably die down entirely. During August the Park Naturalist in company with the Chief Ranger attended a class of instruction conducted by the Bureau of

The first part of the paper is devoted to a general discussion of the problem of the existence of a solution of the system of equations (1) for arbitrary values of the parameters $\alpha, \beta, \gamma, \delta, \epsilon, \zeta, \eta, \theta, \iota, \kappa, \lambda, \mu, \nu, \xi, \omicron, \pi, \rho, \sigma, \tau, \upsilon, \phi, \chi, \psi, \omega, \varphi, \eta, \theta, \iota, \kappa, \lambda, \mu, \nu, \xi, \omicron, \pi, \rho, \sigma, \tau, \upsilon, \phi, \chi, \psi, \omega, \varphi$. It is shown that the system has a solution for arbitrary values of the parameters if and only if the following conditions are satisfied: $\alpha + \beta + \gamma + \delta + \epsilon + \zeta + \eta + \theta + \iota + \kappa + \lambda + \mu + \nu + \xi + \omicron + \pi + \rho + \sigma + \tau + \upsilon + \phi + \chi + \psi + \omega + \varphi = 0$ and $\alpha^2 + \beta^2 + \gamma^2 + \delta^2 + \epsilon^2 + \zeta^2 + \eta^2 + \theta^2 + \iota^2 + \kappa^2 + \lambda^2 + \mu^2 + \nu^2 + \xi^2 + \omicron^2 + \pi^2 + \rho^2 + \sigma^2 + \tau^2 + \upsilon^2 + \phi^2 + \chi^2 + \psi^2 + \omega^2 + \varphi^2 = 0$.

In the second part of the paper, the problem of the existence of a solution of the system of equations (1) for arbitrary values of the parameters is solved. It is shown that the system has a solution for arbitrary values of the parameters if and only if the following conditions are satisfied: $\alpha + \beta + \gamma + \delta + \epsilon + \zeta + \eta + \theta + \iota + \kappa + \lambda + \mu + \nu + \xi + \omicron + \pi + \rho + \sigma + \tau + \upsilon + \phi + \chi + \psi + \omega + \varphi = 0$ and $\alpha^2 + \beta^2 + \gamma^2 + \delta^2 + \epsilon^2 + \zeta^2 + \eta^2 + \theta^2 + \iota^2 + \kappa^2 + \lambda^2 + \mu^2 + \nu^2 + \xi^2 + \omicron^2 + \pi^2 + \rho^2 + \sigma^2 + \tau^2 + \upsilon^2 + \phi^2 + \chi^2 + \psi^2 + \omega^2 + \varphi^2 = 0$.

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Entomology at Wisdom, Montana, for the purpose of obtaining information on the Mountain Pine Beetle. It is hoped that no attacks of this insect are present in Yellowstone Park but at the present time an intensive survey of the west side of the park is under way for the purpose of discovering whether or not it has entered the boundaries.

GEYSERS AND HOT SPRINGS

Mammoth Hot Springs: Monthly observations of the hot springs during the winter months showed very little fluctuation during that period. One exception is to be noted in Minerva Terrace. Activity in this spring which almost ceased in the fall of 1928 increased greatly and was one of the most beautiful sights at Mammoth during the winter. Stalactites and stalagmites were formed and the exquisite colorings of the grotto were the cause of many visits by the residents of Mammoth. The activity was so great at one time that a roar was plainly audible a hundred feet from the terrace. During the spring of 1929 a general increase in activity was noted in most of the springs at Mammoth. Blue Springs, Orange Spring Mound, Jupiter, Lyman and Harrow Gauge Terraces were all extremely active. The activity of several of these springs made it necessary to reconstruct several portions of trail as the hot water made it impossible to travel over the old route. Activity in Harrow Gauge Terrace which began during the spring and has been maintained until the present time is especially

interesting. Due to the rapid deposition and the extreme activity of this terrace the outlets have become smaller and smaller until the water no longer flows quietly down the sides but is thrown out in beautiful streams, sometimes rising to a height of several feet. Several new springs have broken out just west of Jupiter Terrace and Blue Springs. One large spring has broken out just above Devils Thumb. This spring started activity in March 1926 with a small stream of water trickling down the north slope. Its activity increased, however, and during the tourist season it became one of the major springs of the Mammoth region. The splendid colorings painting the dead formation brilliant hues of orange and red have done much to attract hotel guests to that spot. The beauty of the formations during the past summer have been a great factor in increasing the guide trips at Mammoth, both from the hotel and lodge. The formations have been well policed by members of the formation patrol and defacing of the springs due to carelessness by tourists has been held to the minimum.

Elk, deer, porcupine, pine squirrel and coyote were all seen on the formations during the winter months. A mother deer with two fawns has been the source of much interest to the tourists during the summer. Birds have been plentiful and very few have been found dead in the gas-filled caves. The bats left during

October of 1928 and were not observed in the Devils Kitchen until June of the following year.

Weekly observations of the wiers were made by members of the Educational Department and the results turned over to the officials of the Geo-physical Laboratory. During the summer months one member of the Ranger Naturalist Staff devoted half time to research on the source of the coloring of the hot springs at Mammoth. The result of this work, although by no means complete has brought forth some interesting and instructive facts regarding these colors.

Harris Geyser Basin: The usual variation in activity characterized this basin during the past months. Considerable shifting of activity has been noted, especially during the month of August. Congress Pool drained during the fall of 1928 and became a huge steam vent. During the following spring it filled again and became the same bubbling cauldron as before. During July 1929, however, it again drained and at the present time it is one of the largest steam vents in the basin. Constant Geyser ceased to play in August but in all probability this is only a temporary condition. The unsightly loading platform at Minute Man Geyser has been removed, giving the auto tourist an unobstructed view of the little geyser.

East Thumb Basin: Nothing of special interest is to be reported from this basin. During the past season tourists have been conducted through the basin by the ranger stationed at that point.

Lower Geyser Basin: No considerable change in activity has been recorded for this basin during the past few months. The new geyser which broke out last year and which now bears the name Imperial has continued to play, thrilling thousands with its beauty and power. It plays on an average of twice every 24 hours for a period of 1 1/2 - 2 hours. A good trail has been constructed from the end of the road to the geyser and many tourists visit this geyser daily. The boiling level of the Fountain Paint-pot has dropped about 12 inches during the past few months but still continues to bubble actively and is a source of much interest to the tourists. The lowering of the water level may be due to the extreme humidity of the atmosphere which we have experienced during the past few months. Great Fountain Geyser has been playing regularly every eight to ten hours, although the Fountain Geyser has not been observed in eruption this summer.

Upper Geyser Basin: This, the greatest of all geyser basins, has witnessed an increase in activity during recent months. The Boshive Geyser erupted during the early part of June but few tourists were present to witness this eruption. Giantess underwent a period of activity during the first part of the season but since that time no eruption had occurred. An increase in activity of Giant Geyser was noted during the first part of the season when it erupted several times. This activity has continued on a minor scale throughout the summer. On July 3 the

guide parties were fortunate enough to witness four major geysers of the Upper Basin - Castle, Giant, Giantess and Old Faithful - playing at one time. Grand Geyser, in the opinion of many, the most beautiful geyser in the park, continues to play with no sign of diminishing power. Daisy Geyser in the Black Sand Basin seems to be increasing slightly in power and it is unusually witnessed in eruption by members of the guide parties during the morning.

EDUCATIONAL DEPARTMENT

The staff during the winter consisted of a park naturalist and the part time assistance of two rangers. During the summer it consisted of the park naturalist, head ranger naturalist, 16 ranger naturalists, and one park ranger. In addition to this three park rangers have cooperated in giving lectures and conducting guide trips.

The outstanding event in the Educational Department for the year was the opening of the Museum of Thermal Activity at Old Faithful as the result of a portion of the fund from the Laura Spelman Rockefeller Foundation. The building consists of an information office, exhibit room, open court, and a study room for ranger naturalists. Although primarily a museum of thermal activity, other exhibits such as historical, botanical and zoological are to be seen. The open court is devoted to evening lectures and each night is filled to capacity. The Old Faithful Museum became at once popular with the tourists and 95,080 persons

visited the building during the 1939 season. The Museum at Mammoth opened on June 1 and has continued to attract crowds throughout the summer. The attendance for the tourist season was 59,507 against 68,487 for the season of 1938. The publications sold at this point numbered 7,498 amounting to \$4,356.14 as compared with 5,211 pieces at the Old Faithful Museum amounting to \$2,824.50

Twelve lectures were given daily at the main points of the loop. The three lectures given each evening at Mammoth were attended by 35,742 persons for the season; the two at Old Faithful by 182,276; one at West Thumb by 4,170; two at Canyon by 37,064; two at Lake by 26,014; one at Fishing Bridge by 21,631; and one at Tower Falls by 3,546 persons. In addition several lectures were given throughout the day by ranger naturalists on Mt. Washburn. Illustrated lectures were instituted at two places during the past season, namely Mammoth Lodge and Old Faithful Museum. The total lecture attendance for 1939 was 324,969 against 277,254 for the previous season.

Eighteen guide trips were conducted daily in Yellowstone Park during the past season. 87,192 persons availed themselves of this activity. Two additional hikes were established this year, namely a nature guide trip from Fishing Bridge Auto Camp and a twilight hike over the formations at Mammoth. The totals on the guide trips at the various points were as follows:

Mammoth 19,142; Old Faithful 34,655; Lake 7,453; Fishing Bridge 1,649; Canyon 12,361; Tower Falls 1,042. In addition to this the tourists traveling on the yellow busses were accompanied over the West Thumb Basin. The total for these trips was 7,990.

Nature Notes from Yellowstone Park have been issued each month and franked to approximately 425 newspapers, libraries, and individuals. The 1929 Ranger Naturalists Manual of 205 pages was issued in June. This Manual contained the results of historical research throughout the winter as well as many scientific and popular articles written by the Yellowstone staff and scientists interested in the park.

IMPROVEMENT BY PUBLIC UTILITIES AND INDIVIDUAL OPERATORS

Yellowstone Park Transportation Company: Garage compounds were completed at Old Faithful, Lake and Canyon. Old garage buildings removed from behind Old Faithful Inn.

Yellowstone Park Hotel Company: Additions to boiler room and alteration of kitchen started at Old Faithful Inn. New lobby and kitchen alterations completed at Lake Hotel. Dormitories for bus drivers started consisting of two buildings of 60 single bed capacity each with wash room building between.

Yellowstone Park Company: Lodges

Mammoth - Entire layout repainted but no changes nor additions; total number of cabins 252, house capacity about 700.

Old Faithful - Six new cabins, total 309; capacity 750.

Lake - 51 new cabins, total 233; capacity about 550.
 Laundry building completed which will serve Lake, Fishing
 Bridge, West Thumb and East Entrance. Porte-cochere com-
 pleted.

Canyon - 36 new cabins, total 256; capacity about 700.
 Three 4-room dormitories completed and two double comfort
 stations started. Linen room with 30 capacity dormitory above
 started.

Camp Roosevelt - 10 new cabins, total 43; capacity about
 130.

Sylvan Pass Lodge - no changes, 11 tent-cabins; capacity
 about 10.

Housekeeping Units

Mammoth - 35 new permanent type cabins, total 117; capacity
 about 300.

Old Faithful - 106 new tent cabins, total 256; capacity
 about 650; 60 permanent type cabins under construction. Office
 building with 24 capacity dormitory above completed.

West Thumb - 51 new tents, total 45 tents; capacity about
 100. Built on new site including building of two streets behind
 ranger station. Old tents entirely removed from auto camp.

Fishing Bridge - Office building with 24 capacity dormitory
 above completed. Double comfort station completed. 36 new tents,

total 180; capacity about 480; 60 permanent type cabins under construction.

Canyon - 141 tents; capacity about 275. New double comfort station started. Cafeteria and office building with 40 capacity dormitory above completed.

Lower Falls - 5 new tents, total 25; capacity about 60. Moved onto a temporary location.

Haynes Picture Shows: New studio building at Mammoth which has girls dormitory above of 23 capacity.

Hamilton Stores: Old Faithful - New store, 150 feet. frontage, with 43 capacity dormitory above, under construction in auto camp.

Fishing Bridge - Duplicate of above store started.

Yellowstone Park Fuel Company: Fuel compounds for sale of split wood were constructed at Mammoth, Old Faithful, Fishing Bridge and Canyon.

PERMITS AND FEES

Nine saddle horse permits were issued during the year, three permits to take motion pictures, and three track permits.

DEPARTMENT OF JUSTICE - U. S. COMMISSIONER'S COURT

Hon. John W. Moldrum, Commissioner since 1894, presiding. Proceedings were had in 14 cases during the year. There were 14 convictions and 0 acquittals. A total of \$1,041 in fines, exclusive of costs were imposed. There were 3 cases involving

violations of traffic regulations, 5 cases involving violations of the Federal Prohibition Act, 0 cases involving violations of the fishing regulations, 0 cases account of defacing the hot springs and geyser formations, and 1 case of assault.

POST OFFICE DEPARTMENT

Mr. C. C. March was appointed Assistant Postmaster effective May 1, 1929. The five postal stations maintained during the season of 1928 were reopened at the beginning of the season of 1929. One of these, Old Faithful, was re-opened as a classified station instead of a contract station as heretofore; the other four, namely Lake Outlet, Fishing Bridge, Canyon and Tower Falls, were continued as contract stations. The Star Route connecting these stations was continued for the tourist season, and additional star route service was provided to connect the main post office with West Yellowstone, Montana, and Old Faithful Postal Station with the same point, for dispatch of certain mail for the southwest that could be thus facilitated in delivery. The postal service shows a steady increase in business, in proportion to the increased tourist travel to the park.

DEPARTMENT OF THE INTERIOR

National Park Service: Hon. Horace M. Albright, Director of the National Park Service, spent about half of the summer in the Yellowstone, acquainting the new superintendent with his work and aiding in the carrying on of the season's activities.

Frank A. Pittsford, Chief Engineer, spent a couple of days late in July looking over road matters, having come to the Yellowstone from the Grand Teton National Park, where he made an inspection tour.

Thomas C. Vint, Chief Landscape Architect, made two trips during the year, one in late January and the other in early July.

Carl F. Russell, Field Naturalist, was in the park in October, 1928, and spent most of the summer of 1929 aiding with the educational work.

Carl Bachan, Land Expert, spent several days here in early August, prior to his visit to Glacier National Park to look into land matters there.

W. A. Blossom, Auditor, came in on August 24 and spent several days looking into accounting matters.

Geological Survey: S. R. Cappe, of Washington, D. C. stopped off in the Yellowstone on May 29 for two days enroute to Alaska.

Dr. W. C. Alden came in early in June to conduct some special investigations in the area around Tower Falls.

The usual inspections of water gauge stations were made during the summer by members of the Survey's office in Boise, Idaho.

TRUSTY DEPARTMENT

General Accounting Office: J. B. Danit, Felix Cristofane and E. F. Inbody of the Washington Office, visited the park from August 22 to 27 in connection with accounting matters.

Public Health Service: H. B. Harmon, Sanitary Engineer in charge of sanitation work in the National Parks, spent the period from June 21 to July 4 in the park on sanitation matters.

The Public Health Service continued to keep an assistant surgeon in the park to aid in safeguarding health. Dr. Frank G. Grace of Minnesota was appointed to the position vice Dr. Howard C. Anderson of North Dakota.

Dr. R. R. Spencer, of Washington, D. C. was sent to the park in order to make an investigation of conditions affecting an epidemic which resulted in sickness to guests and employees.

DEPARTMENT OF AGRICULTURE

Weather Bureau: Mr. Glen Jefferson has been in charge of the weather Bureau activities in the park during the year. He has furnished us with many routine and special reports.

Bureau of Entomology: Dr. J. C. Evenden of the Coeur d'Alene, Idaho, office of the Bureau made two trips into the park during the summer to look over insect infestation conditions. One of his assistants, a Dr. Balch, was engaged in the insect infestation work in the Bechler River Section for a part of the summer.

Bureau of Public Roads: Several members of the Bureau of Public Roads, including Dr. L. I. News, Regional Director, San Francisco; A. E. Palen, District Engineer, Denver; and

Shirley Bright, Construction Engineer, San Francisco, paid visits to the park during the summer in connection with the Bureau's activities.

Bureau of Biological Survey: Dr. T. S. Palmer, Senior Biologist, spent from July 7 to 11 in the park.

DEPARTMENT OF COMMERCE

Bureau of Fisheries: Egg collecting at Yellowstone and Fish Lakes was carried on during the summer. The total collection of black spotted trout eggs from park waters was 14,653,000. The plants within the park from the spawn just collected consisted of 7,060,000 fingerlings and 92,000 eyed eggs. Shipments of eggs or fry to points outside the park totaled 6,879,300. District Supervisor C. F. Callier was in charge of this work.

Mr. Fred J. Foster, Special Fish Culturist for the National Park Service and the Bureau of Fisheries, spent most of the summer looking into fish conditions.

Mr. H. C. James, Assistant Chief of the Division of Fish Culture from Washington, D. C., spent the period from July 11 to 18 in the park.

DEPARTMENT OF JUSTICE

Mr. Van Marcus, Supervising Examiner for the Department of Justice, spent the period from June 23 to July 2 in the park and while here looked into work of the U. S. Commissioner.

HOSPITAL AND MEDICAL SERVICE

Dr. Geo. A. Windear, operating the Yellowstone Park Hospital at headquarters, reports the following cases cared for: 63 accidents (40 minor, 23 major); 56 surgical operations (27 minor, 29 major); 31 contagious; 225 sick. A total of 4,230 were treated in the hotel and camp dispensaries. There were 7 deaths in the park. Approximately 1,700 calls were made by Resident Physician during year.

Carnegie Institution of Washington, D. C.

Dr. Arthur L. Day, Director of the Geophysical Laboratory of the Carnegie Institution, and Dr. E. T. Allen and Dr. H. L. Mason of the same institution were engaged in research work during the summer.

SUBCOMMITTEE OF HOUSE APPROPRIATIONS COMMITTEE

The following members of the sub committee of the House Appropriations Committee for the Department of Agriculture entered the park at the north gate on July 21 and left via the same gateway on July 22: Representative L. J. Dickinson (Iowa), John E. Sumners (Washington), John H. Sandlin (Louisiana) and James F. Buchanan (Texas). They were accompanied by William A. Duval, Clark, and R. Y. Stuart, Chief Forester of the U. S. Forest Service.

DONATIONS

Roadside cleanup work being financed by a friend of the park was continued this year with the donation of \$10,000.

The construction of a fish hatchery at Lake Yellowstone for which \$15,000 was donated by Mr. F. E. Carey of Pittsburgh, Pennsylvania, has continued and at the present time the large fish hatchery which will house hatching troughs, aquarium and office is complete except for installation of some of the fixtures. A thirty man bunk house and a thirty man kitchen will be completed this fall.

The museum construction under the donation of \$118,000 by the Laura Spelman Rockefeller Memorial has been reported upon under building construction. Approximately \$23,000 of this fund has been expended.

Considerable activity has developed in the purchase of lands north of the park for which funds have been made available this year to enable us to match private donations which at the present time have totaled \$37,000.

Several donations were made to the Yellowstone Park Museum by residents of Cooke City, Montana. A number of books received from the American Museum of Naturalist History through Field Naturalist Carl Russell were added to our library collection. J. E. Haynes, authorized park photographer, donated a picture of John Yancey, an old-time resident of the park, as well as fifty hand-painted lantern slides for the use of the Educational Division and for museum purposes. Mr. Harrison Crandall, authorized park photographer in the new Grand Teton National Park, donated several pictures of the Tetons for use in this park.

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